REMARKS

The Examiner is thanked for the careful examination of the application and for the indication of allowable subject matter. However, in view of the foregoing amendments, the remarks that follow, and the Declaration submitted herewith the Examiner is respectfully requested to reconsider and withdraw the rejections. In particular, the Examiner is respectfully requested to particularly consider the Declaration by Mr. Nogami which identifies several errors in the outstanding Official Action. Mr. Nogami has considerable experience and knowledge in the field relating to the present invention.

Claims 1, 4, 5, 8, 9, 14, 15, 20-24, and 26-28 have been rejected as allegedly being obvious over JP 11-168094, hereinafter *Yuda*, in view of USP 6,086,677, hereinafter *Umotoy*, and further in view of USP 5,102,523, hereinafter *Beisswenger*. The independent claims have been amended to recite the plurality of holes are formed so as to satisfy the condition uL/D > 1 during operation of the apparatus, where u is the gas flow velocity inside the holes, L is the effective length of the holes, and D is the gas interdiffusion coefficient. Dependent claims 5, 7, 8, and 27 have been cancelled to avoid duplication.

Applicants submit that *Yuda* does not teach a dividing plate as claimed in the present application. For example, claim 1 recites that the dividing plate is arranged in the vacuum reaction chamber such that the only communication between the plasma discharge space and the film deposition process space is through the plurality of holes extending through the dividing plate. In one embodiment of the invention, the dividing plate extends all the way to the walls of the vacuum chamber, thus preventing gases from passing around the edges of the dividing plate. In contrast to the present invention, the "plate" in *Yuda* is actually a mesh electrode 11 or gas injector 8 which is suspended in the interior of the vacuum chamber. Gases can easily pass around the edges of the electrode 11 or gas injector 8.

In contrast to *Yuda*, with the invention of claim 1, beneficial relative pressures can be maintained in the respective portions of the vacuum chamber so that the flow of gases through the dividing plate can be effectively controlled to achieve a desired distribution of gases and gas pressures to minimize the likelihood that precursor

gases will enter the plasma discharge space. See paragraphs [0025] and [0054]. As set forth above, *Yuda* does not teach or suggest a dividing plate, at least as that term is used in claim 1.

Furthermore, claim 1 now also defines that the plurality of holes are formed so as to satisfy the condition uL/D > 1 during operation of the apparatus, where u is the gas flow velocity inside the holes, L is the effective length of the holes, and D is the gas interdiffusion coefficient. This relationship is significant with respect to the aforementioned feature that the dividing plate is arranged in the vacuum reaction chamber such that the only communication between the plasma discharge space and the film deposition process space is through the plurality of holes extending through the dividing plate so that beneficial relative pressures can be maintained in the respective portions of the vacuum chamber so that the flow of gases through the dividing plate can be effectively controlled to achieve a desired distribution of gases and gas pressures to minimize the likelihood that precursor gases will enter the plasma discharge space.

Umotoy is relied upon for its alleged teaching of a distribution plate having separate passages extending therethrough and fusing together the plates of the distribution plate. *Umotoy* relates to a showerhead arrangement that delivers two different reagents, e.g., titanium tetrachloride and ammonia to a process region 104. In *Umotoy*, the showerhead is not used to separate a plasma generating section from a film forming section below the showerhead. Also, unlike the present invention and *Yuda*, *Umotoy* is not concerned with delivering active radicals from a plasma generating zone to a separate zone.

Applicants submit that *Yuda* and *Umotoy* operate sufficiently differently from each other so that one of skill in the art would not be motivated to combine the references, as proposed by the examiner.

In addition, paragraph 6 of the Official Action alleges that it would have been obvious to modify the *Yuda* device in view of *Umotoy* "in order to avoid the use of o-rings while maintaining a separation of gases as the gases transition form [sic] an upper plate to a lower plate as taught by *Umotoy et al.*" However, *Yuda* does not identify any problems with the plates or gas injectors and certainly does not teach or

suggest sealing such plates with o-rings. Accordingly, since *Yuda* does not teach sealing its plates with o-rings, and does not identify any other problems with the plates, there would not be any motivation to "avoid the use of o-rings" as alleged in paragraph 6 of the Official Action. Accordingly, as set forth in the attached Declaration of Mr. Nogami, there would be no reason to modify *Yuda* based on *Umotoy* as alleged in the Official Action.

The examiner also recognizes a deficiency of the proposed combination of *Yuda* and *Umotoy*, and has added the teachings of *Beisswenger*. However, contrary to the teachings of *Yuda* and *Umotoy, Beisswenger* is not concerned with delivering two different reagents to a processing area and keeping such reagents separate until they reach the processing area. The *Beisswenger* device merely delivers a reactive gas 47 through openings 48 – 54 and draws off the gas in a uniform manner through pipes 39 - 45 so that a uniform coating is achieved. In other words, *Beisswenger* uses the pipes 39 – 45 to evacuate the deposition region uniformly. This is quite different from the present invention which uses a plurality of holes to deliver active radicals to the film deposition space.

Furthermore, *Beisswenger* is not concerned with maintaining a proper pressure relationship between a plasma discharge space and a film deposition process space. In fact, none of the three references are concerned with maintaining a proper pressure relationship between a plasma discharge space and a film deposition process space.

Paragraph 10 of the Official Action alleges that it would have been obvious to provide "seals for arranging the dividing plate such that the only communication between the plasma discharge space and the film deposition process space is through the plurality of holes...in order to prevent gases from escaping upwards as taught by *Beisswenger et al*." However, the seals in *Beisswenger et al* relied upon by the Office Action are not between the plasma discharge space and the film deposition process space. In *Beisswenger et al*, the plasma is generated in the space between the plate 46 and the electrode 22, and the film is also generated in the space below the plate 46. Accordingly, the seals 65, 66 do not in any way

contribute to a separation between the plasma discharge space and the film deposition process space.

Accordingly, as set forth in the attached Declaration of Mr. Nogami, there would be no motivation in *Beisswenger* to provide seals for arranging the dividing plate of *Yuda* such that the only communication between the plasma discharge space and the film deposition process space is through the plurality of holes because the seals in *Beisswenger et al* relied upon by the Office Action are not between the plasma discharge space and the film deposition process space.

Furthermore, the reference in paragraph 10 of the Official Action to "gases escaping upwards" is not relevant to the issue.

The examiner also alleges that it would have been obvious to use the seals of *Beisswenger* to prevent gases from escaping upwards. However, it is in part, the recognition of the desirability of maintaining such pressure differentials between a plasma discharge space and a film deposition process space that is accountable for the present invention. Without this realization, there would have been no motivation to combine the prior art in the manner suggested by the examiner.

Accordingly, all three references relied upon by the examiner operate in a significantly different manner from each other, and none of the references are concerned with the problems to be solved by the present invention. Thus, it is only with the benefit of hindsight of the present application that the examiner was able to piece together a combination of prior art. Accordingly, the rejection is improper and should be withdrawn.

The remarks set forth above with respect to claim 1 also apply to the remaining independent claims.

Claims 4, 14, 20-24, 26, and 28 depend from the independent claims and are thus patentable at least for the reasons set forth above.

Accordingly, the Examiner is respectfully requested to withdraw the rejections of claims 1, 4, 9, 14, 15, 20-24, 26, and 28.

Claims 10, 11, 16, and 17 have been rejected under 35 U.S.C. 103(a) as allegedly being obvious over *Yuda, Umotoy*, and USP 5,433,786, hereinafter *Hu*. However, the examiner is relying upon Hu simply for its alleged teaching of rivets

and fasteners. Accordingly, *Hu* does not otherwise overcome the deficiency of the rejections of the independent claims based on *Yuda* and *Umotoy*. Among other things, none of the three references teach or suggest that the dividing plate is arranged in the vacuum reaction chamber such that the only communication between the plasma discharge space and the film deposition process space is through the plurality of holes. Accordingly, the Examiner is respectfully requested to withdraw the rejections of claims 10, 11, 16, and 17.

In the event that there are any questions concerning this response, or the application in general, the Examiner is respectfully urged to telephone the undersigned so that prosecution of the application may be expedited.

Respectfully submitted,

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